Ecological and Taxonomic Studies of the Aquatic Flora of Kabartal Wetland in Begusarai District of Bihar

A synopsis

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Introduction

The ecosystem services, wetlands, especially terrestrial wetlands, are the most significant. These systems include forests, lakes, rivers, grasslands, and coastal wetlands like tidal marshes and mangroves (Costanza *et al*., 1997). The wetlands are extremely productive habitats that sustain large populations of flora and fauna whose survival depends on the organic output of the wetlands (Desta *et al*., 2012). However, the growing human population and water demands are placing extreme strain on this crucial environment (Acreman *et al*., 2007; Foote *et al*., 1996; IUCN., 1996; Zedler and Kercher., 2005). According to estimations made by IUCN (1996), anthropogenic activities have resulted in the loss of half of the world's wetlands. With agriculture being the main cause (Zedler and Kercher., 2005), since the 1950s, there has been an acceleration of the loss of wetlands in the tropical and subtropical regions (Moser *et al*., 1996). Kabartal Wetland, also known as Kanwar Jheel or Kanwar Lake is the largest freshwater oxbow lake in Asia, and Bird Wildlife Sanctuary, located in the Begusarai District of Bihar, India, covering an area of 2,620 hectares (ha). Kabartal is the largest of a series of shallow permanent as well as intermittently inundated wetlands (Sharma., 1993). Kabartal Wetland was declared a protected area for bird species by the Bihar state government on June 20, 1989 (Singh *et al*., 2021). Additionally, the marsh offers a wide variety of year-round plant and animal life (Prasad., 2016). During the rainy season, the wetland surface size and depth increase due to runoff from nearby communities such as Jaimanglagarh, Parora, Rajour, Sonbasa, Narainpur, Kumbhi, and so on. Even still, the winter and summer dry seasons cause the wetland size to drop drastically. As weeds have proliferated throughout the marsh, wetland biodiversity

has decreased. Agriculture, human disturbances, industrial growth, pollution, hunting and trapping, weather, and climate change are the main causes of the problems. Studying the aquatic flora and exploring the biodiversity and its identification in Kabartal Wetland will increase awareness in society, as wetlands are the most productive ecosystems, and are crucial to maintaining the ecological balance. As the Kabartal Wetland is shrinking rapidly, study of the aquatic flora will provide information on the threats to floral diversity. So, it becomes necessary to perform ecological studies of the aquatic flora of Kabartal Wetland.

Review of Literature

Kabartal Wetland was declared the first Ramsar site on Wetlands of International importance in Bihar by the Ministry of Environment, Forests, and Climate Change (MoEFCC) in November 2020. Following the identification of 24 wetlands of national importance, the National Committee on Wetlands, Mangroves, and Coastal Reefs created MAPs (Management Action Plans) for 10 of the locations based on problems that had been identified so far. Kabartal Wetland is also included in the list. The wetland area decreased from 6,786 ha in 1984 to 4,050 ha in 2004 (Ghosh *et al*., 2004). The lake's area dropped to roughly 2,032 hectares as of 2012 (Kumar & Pandey., 2017). The excessive discharge of sulphate from municipal sources into water bodies is a result of anthropogenic activities and agriculture. This is impacting the biogeochemical cycle that exists within the Kabartal Wetland (Ghosh *et al*., 2004).

Geostatistical techniques assessing the dynamic hydrological connection have been used to analyze the spatiotemporal connectivity patterns of a Kabartal Wetland about the land use/land cover (LULC) of its catchment (Singh & Sinha., 2019). The eutrophic nature of the wetland is demonstrated by the rise in the concentration of key nutrients (phosphorus and nitrogen) over 25 years (1990–2015) in the Kabartal Wetland (Ranjan & Priyanka., 2018). Ambastha *et al.*

(2007) studied the Kabartal Wetland significance to the local population and provided a picture of how benefits are distributed among different stakeholders.

Water quality in Kabartal Wetland is declining alarmingly as a result of the eutrophication process. Furthermore, the wetland's depth is rapidly declining as a result of the infestation of aquatic weeds such as *Hydrilla* and *Phragmatis* (Ghosh *et al*., 2004; Ranjan and Priyanka., 2018). The flora and fauna present in Kabartal Wetland are reported to be decreasing (Alfred & Ramakrishna., 2002; Ramakrishna and Siddiqui., 2002; ZSI., 2002; Roy *et al*., 2008). The floral diversity of Kabartal Wetland was studied by Prasad (2016) and Ramakrishna and Siddiqui in 2002.

Objectives

1. To collect water samples to have a general idea of its physico-chemical nature.
2. Study of the aquatic flora to explore the biodiversity of Kabartal Wetland.
3. To identify the aquatic flora with the help of suitable literature.
4. To study the existing data for additional exploration and study of the aquatic flora diversity of Kabartal Wetland.
5. Brief taxonomic description of existing aquatic flora.

Methodology & Plan of Works

1. To determine the different physico-chemical parameters of water samples such as Temperature, pH, Conductivity, Transparency, Total hardness etc.
2. Study of aquatic flora present in Kabartal Wetland to explore the biodiversity.
3. Collection of data regarding aquatic flora diversity.

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